

REMARKS

Claims 1, 3, 4, and 13-16, are all the claims pending in the application. Claims 2 and 5-12 have been canceled without prejudice or disclaimer. New claims 13-16 have been added to further define the invention. Reconsideration and allowance of all the claims are respectfully requested in view of the following remarks.

Restriction

Claims 5-12 were withdrawn by the Examiner as being directed to a non-elected invention—a washing apparatus. New claims 13-16 have been added, and are directed to the elected Group I—a washing method. Specifically, claims 13-16 are directed to a washing method, and depend from claim 1. Accordingly, claims 13-16 should be examined with the elected Group I, including claims 1, 3, and 4.

Drawings

The Examiner asserted that Figs. 14 and 15 should be designated by a legend such as --Prior Art--. Accordingly, submitted herewith is a replacement drawing sheet (7/7), wherein Figs. 14 and 15 have been labeled as --Prior Art--.

Claim Objections

The Examiner objected to claim 4 as including an informality. Specifically, the Examiner noted that the term --parts-- was omitted after one of the instances of “ring-shaped”. Accordingly, Applicants have amended claim 4 so as to recite “ring-shaped parts”.

Claim Rejections - 35 U.S.C. § 112

The Examiner rejected claims 1-4 under § 112, 2nd paragraph, as indefinite. Specifically, the Examiner asserted that it is not clear which axis of a ring-shaped part is being set forth. Accordingly, Applicants have amended claims 1, 3, and 4, so as to more clearly define the axis as being the central axis around which the ring face extends. Accordingly, this rejection is believed to have been overcome.

Claim Rejections - 35 U.S.C. § 103

The Examiner rejected claims 1-3 under § 103(a) as being unpatentable over Japanese 53-27272 (hereinafter JP '272). Applicants respectfully traverse this rejection because JP '272 fails to teach or suggest all the elements as set forth in the claims.

Claim 1 sets forth a ring-shaped part washing method, comprising: disposing ring-shaped parts in a washing tank, each of the ring-shaped parts including a central axis and a ring face extending around the central axis, the ring-shaped parts being disposed in the washing tank such that the central axes of the ring-shaped parts intersect with a plate surface of an ultrasonic vibration plate at an angle of 30° to 60°, and applying ultrasonic waves generated by the ultrasonic vibration plate, to thereby remove foreign substances from the ring-shaped parts.

The presently claimed invention was developed to solve the problem of washing a plane parallel with a propagation direction of an ultrasonic wave, as that problem exists in the conventional ultrasonic washing method.¹ Accordingly, in the presently claimed invention, the central axes of the ring-shaped parts are disposed so as to be at an angle of 30° to 60° with respect to the plate surface of the ultrasonic vibration plate. With such an angle, the inner peripheral surfaces of the ring-shaped parts can be reached with the ultrasonic vibration, even when the ring-shaped parts vary in thickness.² Further, such an angle allows the ultrasonic waves generated from the ultrasonic vibration plate or reflected from the liquid surface to be positively applied to the inner peripheral surfaces of the ring-shaped parts, thereby reducing the dead zones, which are areas where ultrasonic waves cannot be propagated. Thanks to this, the ultrasonic waves can be applied equally onto all of the outer surfaces of the ring-shaped parts, which makes it possible to obtain a high washing effect.³

In JP '272, the cylindrical body 6 and ultrasonic wave generating apparatus 4, 5, are disposed so that an axis through the holes 35 of the members 13, which are lying on the bottom

¹ Specification at page 2, line 16 - page 3, line 14.

² Specification at page 27, line 21 - page 29, line 4.

³ Specification at page 5, lines 1-13, and page 17, lines 2-25, for example.

of the tank 6, makes an angle of about 75° with the plate surface of the ultrasonic wave generating apparatus 4, 5. But 75° is outside the claimed range 30° to 60° , as set forth in claim 1.

The Examiner then asserts that it would have been obvious to change the angle of inclination of the supporting structure 6, depending upon the time that one desires the members 13 to travel through the apparatus 5 and, thus, be exposed to the cleaning media.⁴ That is, the Examiner asserts that the angle of inclination is “result-effective” of the cleaning time. However, the amount of time that the members 13 are exposed to the cleaning media does not affect the presence or absence of dead zones, which the ultrasonic waves cannot reach. Further, JP ‘272 does not teach or suggest the elimination or reduction of “dead zones”, nor a solution wherein the ultrasonic waves are applied equally onto the inner and outer peripheral surfaces of the ring-shaped parts, including parts extending parallel to their central axes as well as the two end faces that are disposed in a plane that intersects with the central axes at right angles thereto, to thereby obtain a high washing effect. Accordingly, because JP ‘272 is not concerned with the same problem, nor the same solution, as is the presently claimed invention, one of ordinary skill in the art changing the angle of JP ‘272s support structure 6—so as to optimize cleaning time—would not have found the range of angles related to reduction of dead zones, as set forth in claim 1.

For at least any of the above reasons, JP ‘272 fails to render obvious claim 1. Claim 3, similarly to claim 1, sets forth a ring-shaped part washing method, wherein the central axes of ring-shaped parts intersect with a plate surface of an ultrasonic vibration plate at an angle in the range of 30° to 60° . Accordingly, for at least reasons similar to those set forth above, claim 3 is not rendered obvious by JP ‘272.

⁴ Office Action at the paragraph bridging pages 4 and 5.

Allowable Subject Matter

Applicants thank the Examiner for indicating that claim 4 would be allowed if rewritten in independent form. Accordingly, to expedite prosecution of this application, Applicants have rewritten claim 4 in independent form.

Information Disclosure Statement (IDS)

On January 24, 2004—before the first Office Action of September 3, 2003—Applicants timely filed an IDS. However, Applicants have not yet received an initialed copy of the PTO form-1449 submitted with the January 24 IDS. Accordingly, Applicants respectfully request that the Examiner return an initialed copy of this PTO form-1449 with his next Office Action.

Conclusion

Claims 13-16 have been added to further define the invention. Support for the subject matter of claims 14-16 can be found in the specification at, for example: page 7, line 21 - page 8, line 5; page 9, line 18 - page 10, line 2; and page 11, line 23 - page 12, line 4. Further, claims 13-16 depend from claim 1 and, therefore, should be allowable at least by virtue of their dependency.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Amendment Under 37 C.F.R. § 1.111
US Appln. 09/929,368

Atty. Docket: Q65845

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

A handwritten signature in black ink, reading "Jeffrey A. Schmidt", written over a horizontal line.

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